Determinants of flow-mediated outward remodeling in female rodents: respective roles of age, estrogens, and timing

Titre	Determinants of flow-mediated outward remodeling in female rodents: respective roles of age, estrogens, and timing
Type de publication	Article de revue
Auteur	Tarhouni, K. [1], Guihot, Anne-Laure [2], Vessieres, Emilie [3], Toutain, Bertrand [4], Procaccio, Vincent [5], Grimaud, Linda [6], Loufrani, Laurent [7], Lenfant, F. [8], Arnal, Jean-François [9], Henrion, Daniel [10]
Editeur	American Heart Association
Type	Article scientifique dans une revue à comité de lecture
Année	2014
Langue	Anglais
Date	2014
Numéro	6
Pagination	1281 - 9
Volume	34
Titre de la revue	Arteriosclerosis, Thrombosis, and Vascular Biology
ISSN	1524-4636
Mots-clés	Aging [11], Animals [12], Endothelium, Vascular/physiology [13], Estradiol/blood/physiology [14], Estrogen Receptor alpha/analysis [15], Extracellular Signal-Regulated MAP Kinases/physiology [16], Female [17], Mesenteric Arteries/pathology/physiology [18], Nitric Oxide Synthase Type III/analysis [19], Ovariectomy [20], Rats [21], Rats, Wistar [22], Regional Blood Flow [23], Stress, Mechanical [24], Superoxide Dismutase/metabolism [25], Time Factors [26], Vascular Resistance [27], Vasodilation [28]

Résumé en anglais	OBJECTIVE: Flow (shear stress)-mediated outward remodeling (FMR) of resistance arteries is a key adaptive process allowing collateral growth after arterial occlusion but declining with age. 17-beta-estradiol (E2) has a key role in this process through activation of estrogen receptor alpha (ERalpha). Thus, we investigated the impact of age and timing for estrogen efficacy on FMR. APPROACH AND RESULTS: Female rats, 3 to 18 months old, were submitted to surgery to increase blood flow locally in 1 mesenteric artery in vivo. High-flow and normal-flow arteries were collected 2 weeks later for in vitro analysis. Diameter increased by 27% in high-flow arteries compared with normal-flow arteries in 3-month-old rats. The amplitude of remodeling declined with age (12% in 18-month-old rats) in parallel with E2 blood level and E2 substitution failed restoring remodeling in 18-month-old rats. Ovariectomy of 3-, 9-, and 12-month-old rats abolished FMR, which was restored by immediate E2 replacement. Nevertheless, this effect of E2 was absent 9 months after ovariectomy. In this latter group, ERalpha and endothelial nitric oxide synthase expression were reduced by half compared with age-matched rats recently ovariectomized. FMR did not occur in ERalpha(-/-) mice, whereas it was decreased by 50% in ERalpha(+/-) mice, emphasizing the importance of gene dosage in high-flow remodeling. CONCLUSIONS: E2 deprivation, rather than age, leads to decline in FMR, which can be prevented by early exogenous E2. However, delayed E2 replacement was ineffective on FMR, underlining the importance of timing of this estrogen action.
URL de la notice	http://okina.univ-angers.fr/publications/ua8211 [29]
DOI	10.1161/ATVBAHA.114.303404 [30]
Lien vers le document	http://dx.doi.org/10.1161/ATVBAHA.114.303404 [30]
Titre abrégé	Arterioscler Thromb Vasc Biol

Liens

[1] http://okina.univ-angers.fr/publications?f[author]=13737
[2] http://okina.univ-angers.fr/annelaure.guihot/publications
[3] http://okina.univ-angers.fr/emilie.vessieres/publications
[4] http://okina.univ-angers.fr/bertrand.toutain/publications
[5] http://okina.univ-angers.fr/v.procaccio/publications
[6] http://okina.univ-angers.fr/linda.grimaud/publications
[7] http://okina.univ-angers.fr/laurent.loufrani/publications
[8] http://okina.univ-angers.fr/publications?f[author]=13739
[9] http://okina.univ-angers.fr/publications?f[author]=674
[10] http://okina.univ-angers.fr/d.henrion/publications
[11] http://okina.univ-angers.fr/publications?f[keyword]=1320
[12] http://okina.univ-angers.fr/publications?f[keyword]=964
[13] http://okina.univ-angers.fr/publications?f[keyword]=13025
[14] http://okina.univ-angers.fr/publications?f[keyword]=13026
[15] http://okina.univ-angers.fr/publications?f[keyword]=13027
[16] http://okina.univ-angers.fr/publications?f[keyword]=13028
[17] http://okina.univ-angers.fr/publications?f[keyword]=1075
[18] http://okina.univ-angers.fr/publications?f[keyword]=13029
[19] http://okina.univ-angers.fr/publications?f[keyword]=13030
[20] http://okina.univ-angers.fr/publications?f[keyword]=12796
[21] http://okina.univ-angers.fr/publications?f[keyword]=975
[22] http://okina.univ-angers.fr/publications?f[keyword]=976

[23] http://okina.univ-angers.fr/publications?f[keyword]=6082
[24] http://okina.univ-angers.fr/publications?f[keyword]=8063
[25] http://okina.univ-angers.fr/publications?f[keyword]=13031
[26] http://okina.univ-angers.fr/publications?f[keyword]=6070
[27] http://okina.univ-angers.fr/publications?f[keyword]=8463
[28] http://okina.univ-angers.fr/publications?f[keyword]=1232
[29] http://okina.univ-angers.fr/publications/ua8211
[30] http://dx.doi.org/10.1161/ATVBAHA.114.303404